

WINDS.

Prevailing Winds.—The prevailing winds for the month are shown by the arrows on chart No. II. They have been south and southeast in the Gulf States, southerly from North Carolina to Massachusetts, southwest over the Lake region, Ohio valley and Missouri, northwest in Minnesota, Dakota and Nebraska.

Total Movement of the Air.—At the Signal Service stations the largest monthly movements are as follows: Pike's Peak, 13,021; Cape Lookout, 11,360; Dodge City, 11,333; Breckenridge, 10,769; Cape Hatteras, 9,512; Cape May, 9,276. The smallest total movements are: Salt Lake City, 3,570; Springfield, 3,567; Montgomery, 3,404; Morgantown, 3,380; Wytheville, 3,263; Albany, 3,219; Augusta, 3,105; Nashville, 2,935; Vicksburg, 2,906; Lynchburg, 2,367. The voluntary observer at Atlanta, Ga., reports 3,470.

Highest Winds.—Among the highest wind velocities reported at the Signal Service stations are the following: Yankton, 18th, NW., 40; Indianola, 18th, SE., 40; Long Branch, 27th, S., 40; Barnegat, 21st, S., 40; Escanaba, 17th, S., 40; Punta Rasa, —, E., 40; Salt Lake City, —, NE., 40; Charleston, 12th, SE., 41; Dodge City, 17th, SE., 41; Smithville, 17th, SW., 41; Breckenridge, —, N., 46; Denver, 3d, S., 48; Grand Haven, 26th, W., 48; Knoxville, 25th, SW., 48; North Platte, 23rd, N., 48; Evanston, 23d, SW., 48; Malone, 19th, SW., 48; Louisville, 23d, S., 52; Davenport, 6th, SW., 60; Mt. Washington, 18th and 22nd, and 24th, 26th and 28th, NW., 60; Pike's Peak, 6th, N., 66. A severe gale was reported off the Georgia coast on the 14th.

High Winds—generally attending hail-storms or tornadoes, are reported from volunteer stations, as follows: 3rd, Starkey, N. Y., destructive wind-storm; 6th, Corning, Mo., strong S. wind, Fort Sully, Dak., gale for 10 minutes, Davenport, Iowa, gale for 3 minutes; De Soto, Neb., heavy wind; Coalville, Utah, high wind; 8th, Starkey, N. Y.; 9th, Madison Barracks, N. Y., high wind; 11th, Ephrata, Pa., destructive wind; 18th, Kenton, Ohio, severe wind-storm; 18th, Blooming-grove, Penn.; 20th, Olive Furnace, Ohio, severe wind; 23rd, Milledgeville, Ky., violent wind, Alpena, gale for 15 minutes; 30th, Ellinwood, Kan., high wind.

Tornadoes—on the 7th and the 15th, tornadoes occurred near Dodge City, the former was quite severe; 23rd, Paris, Ky.; 24th, at Portage, Penn.; on the 25th, at 3:45 p. m., a tornado passed just east of Lenoir, N. C., where several houses were blown down; the storm passed from N.W. to S.E. On the 25th, about 4 p. m., a tornado or waterspout passed through Kingsbury, Hartford and Hebron, N. Y.; the width of the storm-track was about 200 yards, its duration at any point was 17 or 18 minutes—heavy hail-stones fell, of which 15 per cent. were one inch in diameter. At the same time with the preceding storm, a more violent one passed in nearly the same direction, 40 or 50 miles to the northward, passing into Vermont near Rutland. On the 26th, near Pueblo and Hard Scrabble cañon, Col., between 3 and 4 P. M., a very severe storm is reported, having a track about two miles wide; hail-stones, to the depth of 18 inches, were lying on the ground next day; it is noted that clouds had been collecting for two days previously, and that shortly before the storm they were seen to be rising from the neighborhood of Pike's Peak in huge black masses.

VERIFICATIONS.

Cautionary Signals.—Twenty-four Cautionary Signals have been displayed at the United States Signal Service stations, of which four were ordered too late, five were not justified, and nineteen were reported justified. Eighty-five additional cases were reported, in which winds passed the limit of 25 miles per hour, but most of them were of a local and temporary nature of these winds, for which Cautionary Signals were not required.

Probabilities.—A comparison of the published tri-daily Probabilities with the weather of the succeeding 24 hours gives 82.3 as the general average per centage of verifications; the per centage for the separate districts are as follows: New England, 83.9; Middle States, 87.0; South Atlantic States, 82.3; Eastern Gulf States, 81.2; Western Gulf States, 84.6; Tennessee and Ohio valley, 80.0; Lower Lake region, 82.6; Upper Lake region, 79.7; Upper Mississippi valley, 81.0; Lower Missouri valley, 82.4. The per centages for the separate meteorological elements were—for temperature, 83.1; wind, 86.3; weather, 84.2; barometer, 76.3.

NAVIGATION.

Stage of Water.—The highest and lowest readings on the river gauges are given in the table on Chart No. III, from which it will appear that the rivers were lowest during the latter portion of the month at Shreveport and St. Paul, but were highest at that time at Leavenworth, Pittsburgh and St. Louis. The Missouri river rose above "danger line" at a few stations between Leavenworth and St. Louis. The Mississippi was above "danger line" during the first part of the month in the neighborhood of Vicksburg. Re-

ports from Fort Benton show that throughout the month the Missouri was higher, perhaps, by four feet than was ever before known, which was attributed, by the observer at that place, to the unusual quantity of melting snow. The changes in the river below Yaukton seem, however, not to have been, as yet, materially affected by the high water of the Upper Missouri, but were almost entirely due to the local rains in the Northwest; the rise due to the melting snows of the Rocky mountains will probably affect the lower river during July. The melting snows have caused similar extraordinary floods in Oregon.

Freshets.—The heavy rains that occurred in South Carolina and Georgia during the middle of the month gave rise to one of the highest stages of water on record at Savannah, and probably throughout that region. The observer at Gainesville reports eight lives lost and damage to the extent of \$1,000,000. The observers in Kansas report waters high in consequence of excess of rain. The observer at Corning, Mo., reports that destructive floods followed heavy rains. The observer at Asheville, N. C., reports on the 17th a great freshet in the French Broad river, and on the same date floods are reported from Lenoir, N. C. The observer at Neillsville, Wis., reports the extreme rise of Black river this spring eight feet.

Ice in Lakes and Rivers.—The observer at Ashland, Wis., reports that the navigation of Lake Michigan was interfered with by ice up to the 14th. Lake Superior, at Duluth, was obstructed by ice until the 25th; the harbor was clear on the 28th.

WATER TEMPERATURES.

The table on Chart No. II gives the maximum and minimum temperatures of the water near the bottoms of rivers and harbors. The lowest minima temperatures reported are 40° at Marquette and Eastport; 32° at Duluth; 48° at Burlington; 50° at Portland, Me. The highest maxima are 92° at Punta Rasa; 90° at Key West; 89° at Jacksonville and Norfolk; 85° at Montgomery and Augusta; 84° at Charleston and Mobile; 83° at Nashville. The largest ranges of temperature are 24° at Burlington; 17° at Omaha, New York, Keokuk and St. Paul; 16° at New London, Pittsburgh and Norfolk; 14 at Alpena, Augusta, Leavenworth and Wood's Hole. The least ranges are 7° at Detroit and St. Marks; 6° at St. Louis; 5° at Chicago, Milwaukee, Mobile and Savannah; 4° at Eastport and 3° at Wilmington.

ATMOSPHERIC ELECTRICITY.

Aurora.—Auroras have been faint, ill-defined, and often the observers have been doubtful as to the true nature of the phenomena. They are reported as follows: On the 3rd and 4th, at Corning, Mo.; 7th, Eastport, Me.; 10th, Litchfield, Mich.; Fort Sully, D. T.; 11th, Duluth, Minn.; 12th, Dodge City, Kan.; Pike's Peak, Col.; 13th, Pike's Peak, Col.; 18th, Pike's Peak, Col.; 23rd, Cleveland, Ohio, Eastport, Me.; 26th, Eastport, Me.; 27th, Le Roy, Wis., Malone, N. Y.; 29th, Abington, Ill., Carthegena, Ohio, Duluth, Minn.; 30th, Eastport, Me.

Telegraphic Ground Currents—were noted on the 15th at Colorado Springs; 3rd and 27th, at Philadelphia; 16th, 27th and 28th, at Pike's Peak; 17th, 23rd and 28th, at Santa Fé.

Lightning.—In order to obtain an approximate idea of the number of thunder-storms during the month, a count has been made of every case recorded at the 445 stations of lightning or thunder, whether near to or distant from the station; by including silent or distant lightning, it is presumed that the record for each station may be assumed to represent all cases that occur within a radius of fifty miles, and although in many instances the same storm having been observed at several stations will therefore be counted more than once, yet, on account of the fragmentary nature of most records, it is safe to presume that the sum total for the whole country, which is 1,344, is below rather than above the truth. The chronological distribution of these cases is given in the following statement: On the 1st, 33; 2nd, 40; 3rd, 53; 4th, 37; 5th, 7; 6th, 34; 7th, 27; 8th, 25; 9th, 58; 10th, 82; 11th, 64; 12th, 47; 13th, 23; 14th, 47; 15th, 39; 16th, 34; 17th, 24; 18th, 15; 19th, 24; 20th, 53; 21st, 43; 22nd, 39; 23rd, 67; 24th, 63; 25th, 96; 26th, 68; 27th, 84; 28th, 41; 29th, 39; 30th, 33. The geographical distribution is shown in the following statement: For the Atlantic and Gulf States—Maine, 37; New Hampshire, 28; Vermont, 33; Massachusetts, 56; Rhode Island, 2; Connecticut, 22; New Jersey, 32; Delaware, 7; Maryland, 24; District of Columbia, 8; Virginia, 38; North Carolina, 52; South Carolina, 9; Georgia, 29; Florida, 22; Alabama, 17; Mississippi, 46; Louisiana, 41; Texas, 18. For the Appalachian region—New York, 110; Pennsylvania, 40; West Virginia, 14; Kentucky, 22; Tennessee, 56. For the interior—Ohio, 74; Indiana, 38; Illinois, 91; Iowa, 111; Missouri, 19; Arkansas, 6. For the western plateau—Nebraska, 43; Kansas, 65; Indian Territory, 3; Wyoming Territory, 1; Colorado, 11; New Mexico, 21. For the northern boundary—Michigan, 38; Wisconsin, 31; Minnesota, 11; Dakota, 22; Montana, 1. For the Pacific slope—Idaho, 4; Nevada, 4; Utah, 1.